AMAZONIANA XVI (3/4): 325-336 Kiel, Dezember 2001

Agnurodesmus siolii n.sp., the first Cyrtodesmidae to be reported from Brazil, with remarks on the genus and family (Diplopoda, Polydesmida)

by

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(Accepted for publication: November, 2000).

Abstract

A new species of Cyrtodesmidae is described from a terra firme tropical rainforest patch near Manaus, Central Amazonia of Brazil: *Agnurodesmus siolii* n.sp. Being the first formal record of a cyrtodesmid in Brazil, this species, named after Prof. Dr. Harald SIOLI, seems to be particularly closely related to *Cliodesmus cryptopygus* CHAMBERLIN, 1923, from Guyana, the type-species of *Cliodesmus* CHAMBERLIN, 1923, a genus hitherto treated of unclear status. The new species differs by the incomplete ozopore formula (5, 15-18 versus normal), more numerous (5-6 versus 3-4) crenulations at the lateral edge of paraterga 3 and 4, and certain details of gonopod structure, but otherwise the long established synonymy of *Cliodesmus* under *Agnurodesmus* SILVESTRI, 1910 is supported. The entire family Cyrtodesmidae is redefined, especially versus its counterpart family Pyrgodesmidae in the superfamily Pyrgodesmoidea, with new diagnoses provided for all three currently accepted cyrtodesmid genera: *Oncodesmella* KRAUS, 1959 (two species, including *O. pastazia* (KRAUS, 1960), comb.n. ex *Agnurodesmus*), *Cyrtodesmus* COOK, 1896 (about 25 species), and *Agnurodesmus* SILVESTRI, 1910 (four species, all keyed). The distribution pattern of Cyrtodesmidae being highly coherent, confined to northern South America, Tobago, and Central America up to Costa Rica in the north, this family represents another example of the rather numerous groups of Neotropical Diplopoda that managed to cross northward, however modestly, the Panamanian portal known to have been closed since the Pliocene. The Seychellean genus *Hyperothrix* ATTEMS, 1900 is formally returned back from Cyrtodesmidae to Pyrgodesmidae not only on morphological but also zoogeographical grounds.

Keywords: **Diplopoda, Cyrtodesmidae, taxonomy, new species, Amazon, Manaus, Brazil.**

*Dedicated to Prof. Dr. Harald Sioli on the occasion of his 90th anniversary.

ISSN 0065-6755/2001/325/

Resumo

É descrita uma nova espécie de Cyrtodesmidae de uma pequena área de terra firme de uma floresta tropical perto de Manaus, Amazônia Central, Brasil: *Agnurodesmus siolii* n.sp. *Agnurodesmus siolii* é a primeira espécie de cyrtodesmídeos formalmente documentada no Brasil e foi nomeada em honra do Prof. Dr. Harald SIOLI. Ela parece ter uma relação muito próxima a *Cliodesmus cryptopygus* CHAMBERLIN, 1923, da Guayana, sendo a espécie tipo de *Cliodesmus* CHAMBERLIN, 1932, um gênero até agora considerado com um estado incerto. A nova espécie difere por ter uma fórmula incompleta de ozoporos (5, 15-18 versus normal), crenulações mais numerosas (5-6 versus 3-4) na margem lateral do paratergo 3 e 4 e certos detalhes na estrutura gonadal. No demais é suportada a sinonímia de *Cliodesmus* sob *Agnurodesmus* SILVESTRI, 1910 estabelecida há muito tempo atrás. A família inteira de Cyrtodesmidae é redefinida, em comparação com sua família de contraparte, Pyrgodesmidae, na superfamília Pyrgodesmoidea. Providên-ciam-se novas diagnoses para todos os três gêneros atualmente aceitos: *Oncodesmella* KRAUS, 1959 (duas espécies, incluindo *O. pastazia* (KRAUS, 1960), comb.n. ex *Agnurodesmus*), *Cyrtodesmus* COOK, 1896 (aprox. 25 espécies), e *Agnurodesmus* SILVESTRI, 1910 (quatro espécies, todos com chave). O padrão de distribuição de Cyrtodesmidae é altamente coerente. Confinada ao norte da América do Sul, Tobago e América Central até o norte da Costa Rica, esta família representa mais um exemplo dos bem numerosos grupos de diplópodos Neotropicais que conseguiram cruzar para o norte, apesar do portal panamenho ter estado fechado desde o Plioceno. Baseando-se tanto na sua morfologia como sua zoogeografia o gênero *Hyperothrix* ATTEMS, 1900 dos Seicheles é formalmente recolacado de Cyrtodesmidae para Pyrgodesmi-dae.

Introduction

The Cyrtodesmidae is a small millipede family containing but 3-4 valid genera and only about 30 species restricted to northern North America and southern Central America up to Costa Rica in the north. No members of Cyrtodesmidae have heretofore been report-ed from Brazil, although a few species have long been described from the adjacent parts of Colombia, Venezuela and Peru (cf. HOFFMAN 1980).

This paper deals with the first cyrtodesmid to be formally recorded in Brazil, in particular a new species from a patch of primary tropical rainforest on terra firme in the environs of Manaus, Central Amazonia. Furthermore, as the new species appears to show particularly close affinities with a genus hitherto treated of unclear status, a discussion is provided to properly assign this genus, and to attempt a review and a reclassification of the Cyrtodesmidae.

Type material is largely deposited in the collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Brazil (INPA), with only a few paratypes retained for the collection of the Zoological Museum of the Moscow State University, Moscow, Russia (ZMUM) and the ADIS Collection, Plön, Germany.

Taxonomic part

Agnurodesmus siolii n.sp. (Figs. 1-12)

Holotype ♂ (INPA), Brazil, Amazônas, environs of Manaus, Reserva Florestal A. Ducke (2°55'S, 59°59'W), primary tropical rainforest on terra firme, Kempson extraction (K24 RD6), 12.02.1983, leg. J. ADIS.

Paratypes: 1 ♂, 1 ♀ (INPA), same locality (K22 RD4), 8.12.1982; 1 ♂ (ZMUM), same locality (K22 RD 6), 12.02.1983; 1 ♂ (ZMUM), same locality (K32 RD3), 10.11.1982; 1 ♂, 1 ♀ (Coll. ADIS), same locality (K18 RD5), 12.01.1983; 1 ♀ (INPA), same locality (K29 RD4), 8.12.1982; 1 ♀ (ZMUM), same locality (K31 RD2), 13.10.1982; 1 ♀ (INPA), same locality (K24 RD2), 13.10.1982; 1 ♂ (INPA), same locality (K32 RD3), 10.11.1982; 1 ♀ (INPA), same locality (K17 RD3), 10.11.1982; 1 ♂ (INPA), same locality (K33 RD6), 12.02.1983, all leg. J. ADIS; 6 ♂♂, 2 ♀♀ (INPA), same locality, Winkler extraction and hand-sorting, plot 2, 6.-11.03.1998; 1 ♂, 1 ♀ (ZMUM), same locality, Winkler extraction and hand-sorting, plot 1, 6.-11.03.1998; all leg. S. GOLOVATCH.

Name: Honours Prof. Dr. Harald SIOLI, the outstanding, pioneer explorer of Amazonia's limnology and ecology, the former Director of the Max-Planck-Institute for Limnology in Plön, on the occasion of his 90th anniversary.

Diagnosis: Differs from *A. cryptopygus* (CHAMBERLIN, 1923), from Guyana, apparently the most similar congener, by the peculiar, incomplete ozopore formula (5, 15-18 versus normal), more numerous crenulations (5-6 versus 3-4) at the lateral edge of paraterga 3 and 4, and certain details of gonopod structure (e.g., sometimes crossing coleopod-like structures, flagelliform ribbons, etc.) (see also Key below). *A. siolii* and *A. cryptopygus* agree in the smaller body size, absent antemarginal lobulations on the collum, missing trichome (= tergal pilosity), more evident metatergasl bosses and certain details of gonopod conformation (see below) and by these characters differ from other members of the genus.

Description: Body length ca. 4.5 to 7.0 mm, females 6-7 mm, males 4.5-5.5 mm long. Width of midbody pro- and metazona 0.4-0.5 and 0.6-0.65 mm in ♂, 0.55-0.6 and 0.7-0.75 mm in ♀, respectively. Colouration in alcohol from entirely pallid, whitish, apparently fully faded due to former preservation in picric acid, to annulate due to dark grey-brown vertigial elevation, collum, metaterga and sutural regions. Holotype faintly grey-brown.

Body with 20 segments (18+1+T) (♂, ♀), rather slender, gently rounded at both ends, parallel-sided on somites 2 to 17(18). Head largely smooth, only faintly granulorugose across a very poorly-elevated, transverse, vertigial region, latter usually pigmented, hence easily traceable, centrally sometimes extended down to a little above antennal sockets; epicranial suture rather evident, in darker specimens flanked by small pallid patches; clypeolabral region normal, sparsely setose (Fig. 1). Head on each side with a distinct furrow in front of vertigial region for accomodation of antenna (Fig. 1). Antennae placed close to each other, quite strongly clavate, very short, geniculate between segments 3 and 4; antennomere 5 somewhat longer and broader than 6th, each with a small distodorsal group of minute bacilliform sensilla (Fig. 1).

Collum a little narrower than head, latter a little narrower than segment 2 and subsequent segments (Fig. 1); collum neither covering/concealing the head from above nor bearing lobules/scallops at fore edge; surface slightly wrinkled/tuberculate, sometimes (in darker specimens) with traces of a transverse row of 6+6 small knobs along fore edge and further two rows of flat bosses more caudally (Fig. 2). Surface of subsequent prozona microporose/microalveolate, distinctly shagreened, suture between pro- and metazona similarly reticulate/microalveolate, slightly but increasingly well ribbed/striate longitudinally. Metaterga dull, strongly elevated, surface rather irregularly tuberculate, with two relatively vague rows of flat, usually uneven and subequal/undifferentiated bosses; pattern of dorsal tuberculation as in Figs. 2-5. Tergal trichome absent but, in darker specimens, pale spots surmounting each metatergal boss/tubercle and probably representing insertion points of abraded setae easily traceable (these shown here in Figs. 2-5, but virtually untraceable in paler specimens). Metatergal limbus entire, very delicately crenulate. Dorsum very convex; paraterga set very low, strongly declivent ventrad and slightly laterad to well below the level of venter (Figs. 2-4), not prominent in dorsal view, mostly subvertical (Fig. 5), with neither caudomarginal nor anterior marginal lobules (Fig. 4). Metatergum 2 and its paraterga considerably enlarged compared to other segments. Paraterga 2 and 3 very clearly incised/concave caudobasally for accomodation of an anterior prominence of the following paratergum, paraterga 4 very poorly so (Fig. 2), nearly all subsequent paraterga virtually even caudally (Figs. 3 & 4); paraterga 3-18 rounded laterally, each with 5-6 very small, inconspicuous lobules/crenulations at lateral edge, not radiated; anterior part of paraterga near base normally angulate (Fig. 5), both fore and caudal corners always rounded, caudal corners of segments 17 and, to a lesser degree, 18 drawn caudad and somewhat surpassing the rear tergal contour; paraterga of a

pygidium-like segment 19 in touch medially, fully concealing last segment from above (Fig. 4). Ozopores on paraterga 5 and 15-18 rather evident as paler spots in darker specimens, each flush open on surface at about midway a little above a crenate lateral rim, i.e. quite well removed from lateral edge (Fig. 4). Suture between pro- and metaterga very deep and wide, evident. Tip of epiproct often invisible even in lateral view, sometimes barely visible though (Fig. 4), always surmounted by a bunch of four strong setae. Subanal scale rather high, almost semi-circular, with 1+1 strong, rather well separated setae on knobs at caudal edge.

Legs barely visible from above, unmodified, tarsi sparsely setose, more slender and longer than preceding podomeres, in situ reaching the edge of paraterga, slightly longer and incrassate in ♂ as compared to ♀ (Fig. 6). ♂ coxa 2 pierced with vas deferens as usual, sometimes with a small, glandular, paramedian projection. Sterna very narrow but coxae not contiguous medially, sterna with deep cross-impressions; a pair of small digitiform projections slightly produced caudad between each pair of ♂ caudal coxae (Fig. 6), between ♂ coxae 5 these projections similarly small but directed ventrocaudad, between ♂ coxae 7 these projections much larger and directed more ventrad than caudad.

Gonopod aperture obcordate, very large, shape and size typical for Cyrtodesmidae and Pyrgodesmidae, almost as wide as prozona 7. Gonopods hypertrophied, in situ a bit wider than prozona 7, rather complex (Figs. 7-12). Coxite very large, subglobose, swollen laterally, finely granulate and micropilose anterolaterally, only anteromedially with two (sometimes a few more) chaetae and a small scapuiliform protuberance (p). Telopodites deeply sunken in a densely setose gonocoel, each deeply bipartite, branching at the very base of femorite, with a relatively simple, subtransverse, in situ sometimes crossing, front "coleopod"-like piece (c) protecting a strong, distally complex, often serrate solenomerite lying more caudoventrally, its distalmost part often visible in situ as projecting above level of gonocoxae. Solenomerite branch supplied with a shaggy, flagelliform, hyaline ribbon at base (f), a wide hyaline lobe more distally (l), and some teeth subapically (t).

Epigynal plate inconspicuous.

Remarks: As the above description clearly shows, the new species fits almost exactly the concept/scope of *Cliodesmus* CHAMBERLIN, 1923, monotypic, with *C. cryptopygus* CHAMBERLIN, 1923, from Guyana (cf. CHAMBERLIN 1923). Although this genus has long been synonymized with *Agnurodesmus* SILVESTRI, 1910 (cf. ATTEMS 1940), HOFFMAN (1980) questions this synonymy (see also below). As regards the new species, the only serious distinction concerns the ozopore formula, which is normal (5, 7, 9, 10, 12, 13, 15-19) in *cryptopygus* and apparently the bulk of Cyrtodesmidae (cf. ATTEMS 1940, KRAUS 1960, LOOMIS 1964) but obviously incomplete (5, 15-18) in *A. siolii*. However, one must keep in mind that both Cyrtodesmidae and Pyrgodesmidae are the only constituent families of the superfamily Pyrgodesmoidea (= Stylodesmoidea) in the sense of HOFFMAN (1980, 1982), and both are particularly closely related to one another (SIMONSEN 1990). As the very large family Pyrgodesmidae is well-known for its unusually pronounced variation in ozopore formulas in the entire order Polydesmida, the normal formulas being rather rare there (e.g., GOLOVATCH 1996), some variability in this character can readily be expected amongst Cyrtodesmidae as well. Furthermore, since ozopore formulas in Pyrgodesmidae have recently been shown to be species-specific only (cf. GOLOVATCH 1996, 1998, 2000), obviously the same could also be assumed for Cyrtodesmidae. The discovery of *A. siolii* is clearly evidence of this assumption. Moreover, given the generally small size of the animals and of their ozopores, the atypical, virtually unique formula observed in this species invites a revision of certain type material to verify this character (cf. KRAUS 1960 and below).

The traits that bring *A. cryptopygus* and *A. siolii* together, and isolate them from

most of the other cyrtodesmids, are as follows: relatively small body size (length <1 cm, which is somewhat less than on average, which is around 1.5 cm); collum without traces of antemarginal incisions/lobulations; two transverse rows of large, more or less flat tubercles/bosses on each metatergum; only metaterga 2 and 3 very evidently incised/excavated caudobasally; metatergal trichome largely abraded; most of paraterga with 5-6 crenulations at lateral edge; body segment 19 completely covering segment 20 from above; male legs unmodified; gonopods particularly elaborate, especially well so due to solenomerite branch and a coleopod-like, strongly enlarged front piece; epigynal ridge behind female coxae 2 inconspicuous.

The status of *Cliodesmus* has been treated by HOFFMAN (1980) in a rather contradictory way. In the same treatise, he first assigned this genus to Pyrgodesmidae and then, with reservations though, he listed it as a possible junior subjective synonym of the oligotypic cyrtodesmid genus *Agnurodesmus* SILVESTRI, 1910. The indecision was apparently due to both the rather poor original description of *Cliodesmus*, especially as regards its gonopod traits (CHAMBERLIN 1923), and the earlier synonymization of both these genera by ATTEMS (1940). With new evidence at hand, *Cliodesmus* appears to belong in Cyrtodesmidae and indeed seems to be but a junior subjective synonym of *Agnurodesmus* (see below).

Since the diagnoses of the Cyrtodesmidae, especially versus the Pyrgodesmidae, as given by LOOMIS (1964), HOFFMAN (1982), SIMONSEN (1990) and HOFFMAN et al. (1996) are deficient, incomplete and/or misleading, the opportunity is taken here to hopefully better outline this poorly-known family. Also, according to the Code, the superfamily name Stylodesmoidea must be abandoned as being a junior subjective synonym of the family-group name Pyrgodesmoidea (cf. HOFFMAN 1980, 1982).

The Cyrtodesmidae can generally be characterised as comprising: (1) relatively small (0.5-2.0 cm long), usually dark species with contrastingly pallid venter, antennae and legs (in Pyrgodesmidae, more variable); (2) body in both sexes normally composed of 20 segments, seldom of 19 (in Pyrgodesmidae, more variable, also between sexes); (3) dorsum very convex, paraterga set very low, strongly declivent, sometimes nearly vertical, entire body being more apt for rolling into a spiral (in Pyrgodesmidae, body similarly convex but usually with paraterga set higher, not so strongly declivent ventrally, often directed more laterad than ventrad, hence body not so readily apt for enrollment); (4) head almost smooth, vertigial region neither too coarsely granulorugose nor strongly elevated, these conditions apparently correlated with a small, non-flabellate collum that strongly fails to cover the head from above and sometimes has no traces of antemarginal lobulations/incisions (in Pyrgodesmidae, collum usually strongly flabellate, normally almost fully to very considerably covering the head from above; antemarginal lobulations/radii nearly always evident; hence head strongly granulorugose, and its vertigial region strongly elevated); (5) antennomere 5 usually but not always longer than 6th, with sensilla at least on these segments (same in Pyrgodesmidae); (6) body surface normally rough/dull (same in Pyrgodesmidae); (7) metatergal trichome often present, usually traceable as insertion points even if absent/abraded (obviously not so often present in Pyrgodesmidae, far from always traceable as insertion points when absent); (8) metaterga 2 always enlarged, incised/excavated caudobasally (a condition only very rarely observed in Pyrgodesmidae); (9) at least metaterga 3 (often some of the others as well) similarly incised caudobasally (conditions quite often observed in Pyrgodesmidae, but then without such a differentiation between body segment 3 and subsequent seg-

ments); (10) metatergal tuberculation if any usually not differentiated, only seldom with two paramedian rows composed of larger tubercles (normally strongly differentiated in Pyrgodesmidae, with 2+2 longitudinal paramedian rows of three tubercles each being considerably enlarged compared to others); (11) neither anterior nor numerous posterior marginal lobulations/incisions on paraterga (often these or those, or both present in Pyrgodesmidae); (12) caudal metatergal limbus usually entire, crenulate, more seldom split into denticles/bacilli, generally more uniform (much more diverse in Pyrgodesmidae); (13) last body segment only rarely fully covered by penultimate one, usually visible from above (same condition in Pyrgodesmidae); (14) ozopore formula usually normal (reverse in Pyrgodesmidae); (15) ozopores removed from lateral edge, usually flush open on surface of paraterga, more seldom borne on tubercles or even porostele-like structures (ozopores if any in "chytodesmine" Pyrgodesmidae likewise flush open on surface of paraterga but then largely closer to lateral edge, whereas in "pyrgodesmine" Pyrgodesmidae some pores borne on porosteles, i.e. long stalks usually located at the very latergal edge of paraterga); (16) certain male legs and/or sterna sometimes modified (more rarely in Pyrgodesmidae); (17) coxae close but not contiguous at midline (in Pyrgodesmidae, often almost to entirely contiguous medially like in most other Diplopoda but not Polydesmida); (18) gonopod aperture and coxae (each latter with a more or less well-developed frontoventrolateral apophysis, as a rule) usually very large, complex telopodites normally deeply sunken into a large gonocoel, only seldom gonocoxae small while telopodites strongly exposed (same in Pyrgodesmidae); (19) gonopod telopodite usually deeply bipartite, more seldom tripartite, including an always present solenomerite branch, latter normally conspicuous, only sometimes relatively small but invariably elaborate/furcate (much more diverse in Pyrgodesmidae, solenomerite branch if any usually less elaborate); (20) geographical distribution delimited by the region ranging from Costa Rica to Trinidad, Peru and (?northern) Brazil (indigenous Pyrgodesmidae are known from Central and South America, entire Africa exclusive of Sahara and Madagascar but including some Mascarene and Seychelle islands, Madeira, Canary Islands, southern Spain, India, Ceylon, Southeast and subtropical East Asia up to central China and Honshu, Japan in the north, Australasia, and ?Australia (cf. GOLOVATCH 1996).

It is noteworthy that several of these characters (at least 2, 4, 10-12, 14 and 15) show plesiomorphic states in Cyrtodesmidae as compared to those observed in (most of) Pyrgodesmidae. On the other hand, the situation is reverse at least as regards characters 3 and 8. Apomorphies for Cyrtodesmidae, though obviously none too strong, seem to be characters 3, 8 and perhaps 19 (especially the elaborate solenomerite), maybe also the geographical distribution (attribute 20) which, however, lies fully within the range of Pyrgodesmidae.

Hyperothrix ATTEMS, 1900, monobasic, with *H. orophura* ATTEMS, 1900, endemic to several granitic islands of the Seychelle Archipelago, does resemble Cyrtodesmidae by the almost complete absence of antemarginal lobulations of a relatively small collum that fails to cover from above a relatively poorly granulorugose and evenly convex head. Similarly, *Hyperothrix* has no strongly differentiated metatergal tuberculation (still two transverse rows of very flat bosses are traceable on each metergum) but it displays enlarged metaterga 2 and several other traits rather characteristic of Cyrtodesmidae (cf. ATTEMS 1940). This exactly has been the reason for a formal transfer of this genus from Pyrgodesmidae to Cyrtodesmidae (GOLOVATCH & KORSÓS 1992).

However, in the light of the present discovery and due to the typically pyrgodesmid-like paratergal lobulation pattern (e.g., the laterally, not caudobasally, incised paraterga 2 as well as the other paraterga) and gonopod conformation (very large though extremely deeply sunken complex gonopods, including the coxae), and a near-African provenance (but not necessarily origin), it seems best to return this genus to Pyrgodesmidae. Hence the distribution pattern of the Cyrtodesmidae again becomes highly coherent and represents one of the rather numerous Neotropical diplopod groups that managed to cross northward, however modestly, the Panamanian portal known to have been closed since the Pliocene. The bulk of cyrtodesmid diversity seems to center in the Northern Andes and perhaps also in the Surinam Plateau.

As one can notice, even among Cyrtodesmidae certain evolutionary trends can be traced. This is essential not only for a better understanding of phylogenetic processes in the entire superfamily Pyrgodesmoidea, and even in the entire order Polydesmida, but also for attempting a more coherent generic classification of the family, however poorly it appears delimited against Pyrgodesmidae. Eventually, the currently accepted classification seems quite reasonable (cf. HOFFMAN 1980, 1982, SIMONSEN 1990), requiring but minor amendments. Also, if one sticks to the type species at least, as well as to a gradistic approach to chiefly gonopod-based phylogenetic reconstructions already applied to Polydesmidae and Neotropical Fuhrmannodesmidae (cf. GOLOVATCH 1991, 1992, 1994), it appears opportune to provide new diagnoses of, and some remarks on, all three accepted genera of Cyrtodesmidae.

Judged from the relatively small gonocoxite supporting strongly exposed and relatively simple (though typically deeply bipartite) telopodites, *Oncodesmella* KRAUS, 1959, monobasic, with *O. rostralis* KRAUS, 1959, from central Peru, is basal in position in the family (cf. KRAUS 1959). Among other peculiar traits to diagnose *Oncodesmella*, the normal ozopore formula, a missing tergal trichome and a dorsally fully exposed last body segment can be mentioned. The latter character state is apparently plesiomorphic as well.

Virtually the same basic pattern of gonopod structure is also observed in *Agnurodesmus pastazius* KRAUS, 1960, from Peru, in which the gonopod coxite is relatively small, and the relatively simple, deeply bipartite, suberect telopodites are strongly exposed. In addition, as *A. pastazius* displays a dorsally exposed last body segment, however small, a normal ozopore formula, and no tergal trichome (cf. KRAUS 1960), this species seems best to be formally transferred to *Oncodesmella*: *O. pastazia* (KRAUS, 1960), comb.n. The only significant differences of *O. pastazia* from *O. rostralis* lie in the presence in the former species of modified male femora 7 and of 20, not 19, body segments in both sexes. However, both these characters are apparently species-specific; at least this is generally so in Pyrgodesmidae.

The gonopod plan of *Oncodesmella* could have given rise to one much more common in and rather typical of Cyrtodesmidae. Since this next stage already represents strongly hypertrophied gonocoxites with sunken and highly complex telopodites, we can assume that, with further cyrtodesmids to be revealed and properly described, intermediate stages in gonopod morphological complication might be found. In other words, the world cyrtodesmid fauna is likely to be considerably more diverse than the few dozen species currently described.

Cyrtodesmus COOK, 1896 is here accepted following LOOMIS (1964), i.e. as a rather large genus characterised, among other things, by the exposed last body segment

(a plesiomorphy) and the usually present metatergal trichome, while several to all paraterga normally are incised caudobasally. Neither leg nor sternal modifications are present, as a rule, but antemarginal lobulations on the collum are sometimes traceable. Porostele-like structures occur seldom, mostly absent, the ozopore formula when known is normal. The gonopod telopodite is more or less deeply bipartite, seldom tripartite, yet usually both/all main branches, including a furcate solenomerite, are subequal in shape, rather slender, and their tips are exposed from the gonocoel.

This genus, however large, seems quite homogeneous. It encompasses over two dozen species in Costa Rica to Peru and Trinidad and includes the following junior synonyms: *Oncodesmus* COOK, 1896, *Cyliocyrtus* COOK, 1898, *Trigonostylus* BRÖLEMANN, 1898, *Peltedo* CHAMBERLIN, 1940, and *Oncodesmoides* KRAUS, 1954 (see HOFFMAN 1980). Unfortunately, several species currently assigned to *Cyrtodesmus* have been described too fragmentarily to be certain about their correct generic allocation (cf. ATTEMS 1940).

In contrast, *Agnurodesmus* SILVESTRI, 1910, though a quite small genus, appears heterogeneous. With the above transfer of *Agnurodesmus pastazius* to *Oncodesmella*, the genus *Agnurodesmus* formally includes four species: *Trigonostylus verrucosus* BRÖLEMANN, 1898 (the type-species), from Venezuela, *Cliodesmus cryptopygus* CHAMBERLIN, 1923 (long transferred to *Agnurodesmus* by ATTEMS 1940), from Guyana (formerly British Guiana), *A. thrixophor* CHAMBERLIN, 1923 (omitted by ATTEMS 1940), from Colombia, and *A. siolii* n.sp., from Central Amazonia of Brazil. This genus is characterised by the last body segment fully concealed from above by the penultimate segment (an autapomorphy long noted by BRÖLEMANN 1898), the ozopore formula is normal or abbreviated; the tergal trichome is either present or absent but the insertion points are often traceable; and there are male pregonopodal leg modifications (shared with *Oncodesmella pastazia* only). In addition, in *A. verrucosus* at least (because *A. thrixophor* has been based on a female holotype only), the gonopod telopodite displays a coleopod-like front structure vividly resembling that observed both in *Cliodesmus cryptopygus* and *Agnurodesmus siolii*. This apomorphy is another strong argument to formally suppress *Cliodesmus* and treat it as a junior synonym of *Agnurodesmus*. Revival of *Cliodesmus* is possible in principle for accomodation of *cryptopygus* and *siolii* only (see Key below), but more information is required, i.e. a revision of type material of both *thrixophor* and *cryptopygus*, to justify the distinction.

So redefined, *Agnurodesmus* seems to represent a kind of evolutionary summit among Cyrtodesmidae. The peripheral, southeasternmost occurrence of the Amazonian *A. siolii* is a zoogeographical argument reinforcing this statement. All four constituent species currently accepted in this genus can be separated using the following key:

1. Body larger, at least 13 mm long and 2.0 mm wide. Metatergal tubercles/bosses very poorly expressed, very flat, setigerous, trichome sparse and rather long . . . . . 2.
-. Body smaller, less than 10 mm long and 1.5 mm wide. Metatergal bosses flat but evident, trichome absent . . . . . 3.
2. Anterior row of setae on collum shorter than in posterior rows. Body 13 mm long, 2.1 mm wide (♂). San Esteban, Venezuela. Antennomere 5 slightly shorter than 6th. Male tibiae 3 and 4 particularly enlarged, tarsal brushes present . . . . . *A. verrucosus*
-. Anterior row of setae on collum longer than posteriorly. Body 16 mm long, 2.5 mm wide (♀). San Lorenzo, Colombia. Male unknown, antennae not described . . . . . *A. thrixophor*
3. Ozopore formula normal (5, 7, 9, 10, 12, 13, 15-19). First Mourie, Guyana . . . . . *A. cryptopygus*

-. Ozopore formula incomplete (5, 15-18). Environs of Manaus, Brazil . . . . . *A. siolii*

Acknowledgments

I am greatly obliged to both PD Dr. W. Junk and Prof. Dr. J. Adis who help me obtain grants from the Max-Planck-Society for regular visits to the MPI and, once, to conduct a field trip to Amazonia, always in close collaboration with Prof. Dr. Adis. I wish to acknowledge the constant support rendered to me by the Max-Planck-Society as well as the great help and hospitality of my colleague and friend Prof. Dr. Joachim Adis whose enthusiastic research in the Amazon region of Brazil has yielded very important materials. Also, I am very grateful to Mrs. Irmgard Adis, Miss Bethania Adis, and Miss Berit Hansen for their technical assistance. Prof. Dr. Richard L. Hoffman (Martinsville, Virginia, U.S.A.) and also Prof. Dr. Henrik Enghoff (Copenhagen, Denmark) have been kind enough to revise the final draft of the manuscript and suggested several important improvements.

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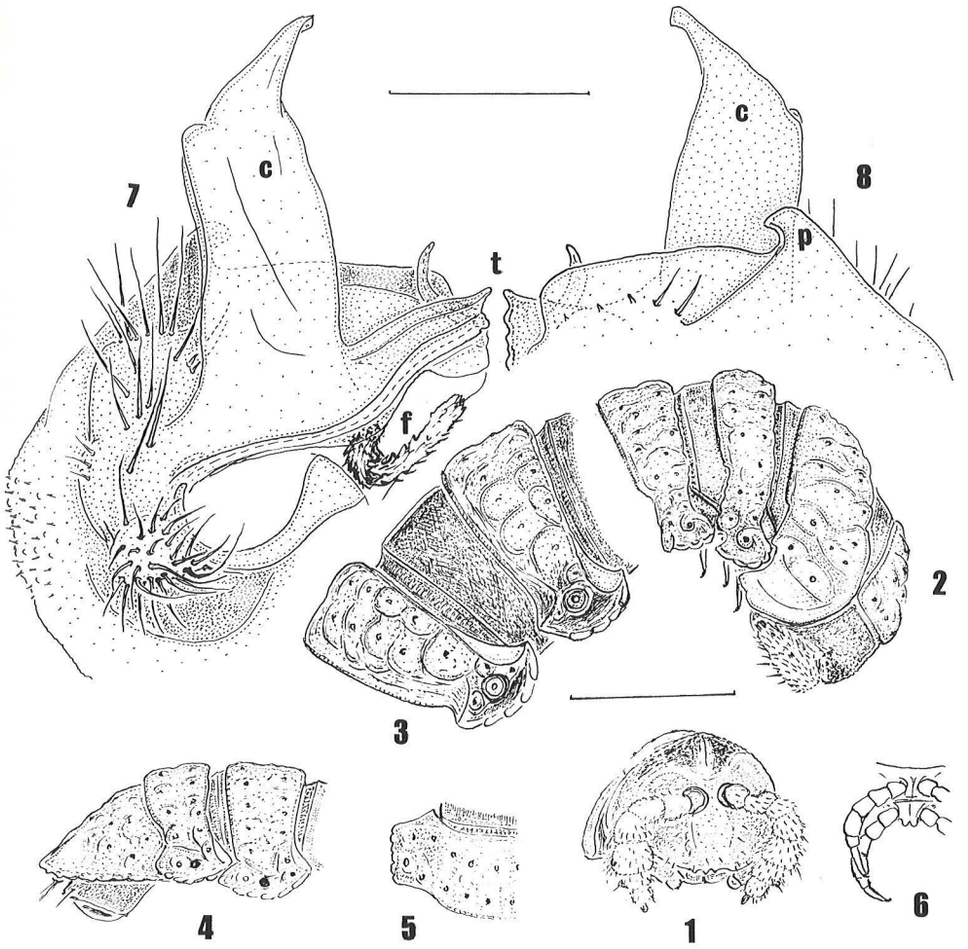
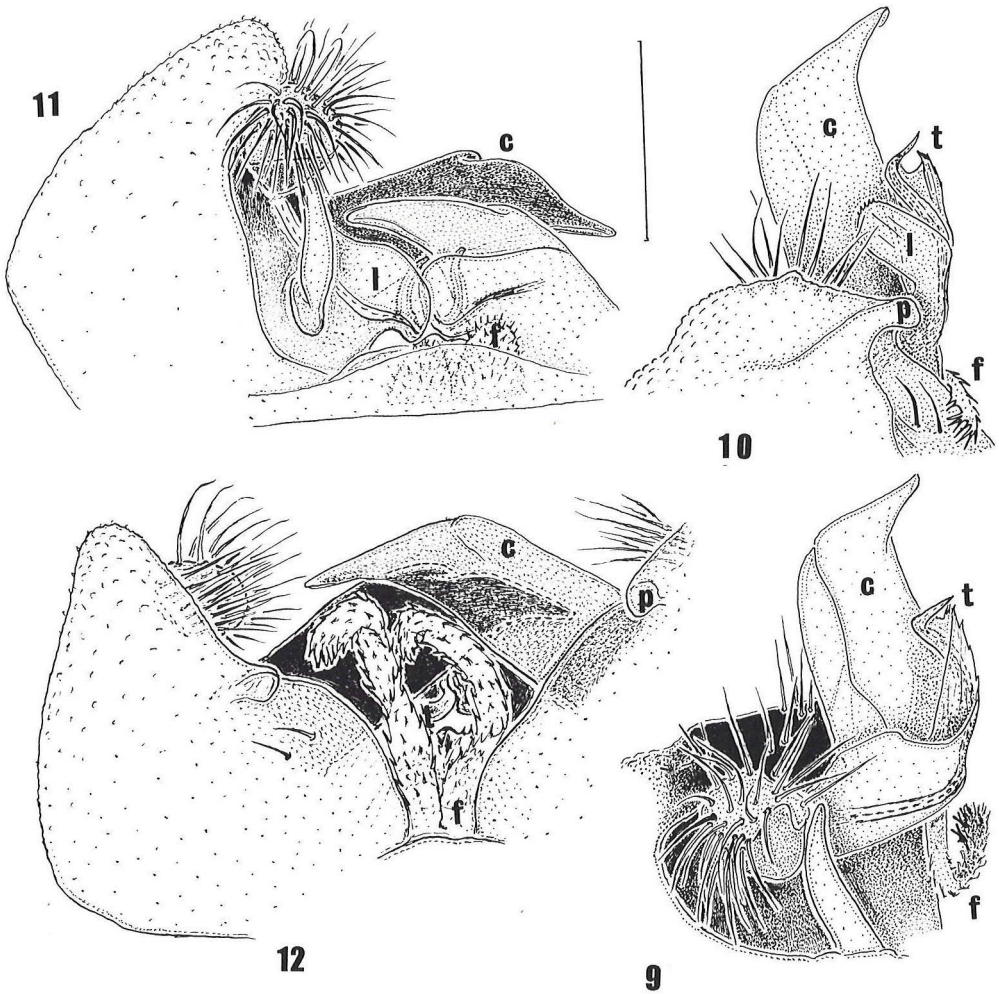


Figs. 1-8:
Agnurodesmus siolii n.sp., ♂ (1, 4-8) and ♀ paratypes (2 & 3).
1: head, frontal; **2**: anterior body part, lateral; **3**: segments 9 and 10, lateral; **4**: caudal body part, lateral; **5**: left paratergum 10, dorsal; **6**: midbody legs and sternites, ventral; **7 & 8**: right gonopod, submesal and sublateral, respectively. - Scale bars: 0.4 (1-6) and 0.1 mm (7 & 8).



Figs. 9-12:
Gonopods of *Agnurodesmus siolii* n.sp., ♂ paratypes.
9: left gonopod, subdorsal; **10**: right gonopod, subventral; **11 & 12**: both gonopods, ventrocaudal and dorsofrontal, respectively. - Scale bar: 0.1 mm.